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Dentistry & Otolaryngology

Submandibular Cervical Mass

Periodontal Health of Patients

Minimal Intervention Dentistry

Highlights

Management of Internal Root Resorption

Discovering Thoughts, Inventing Future

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The Importance of Minimal Intervention Dentistry after the COVID-19 Pandemic: A Look to the Future

By Sayene Garcia Batista & Inger Teixeira de Campos Tuñas

Federal University of Rio de Janeiro

Abstract- The new Coronavirus has caused thousands of deaths around the globe, challenged professionals, and collapsed the health systems of many countries, resulting in various measures to contain the spread of COVID-19 and minimize the number of deaths. In the face of this new scenario, researchers and health authorities have been outlining clinical recommendations for dental practice during and after the pandemic. The objective of this paper is to relate the Minimal Intervention Dentistry (MID) with a dental practice of less exposure to aerosols, and, therefore, safer in the current context, after the pandemic of COVID-19. This study also discusses aspects related to bio safety in dentistry, including aerosol control, and lists some of the MID strategies. Bibliographical research was done in the MEDLINE (US National Library of Medicine - NLM) database accessed through Pub Med. The MID advocates the production of selfcare; it aims to control the health disease process, avoids the repetitive restorative cycle, reduces cost, preserves the healthy dental structure, and minimizes pain, all combined with the control of aerosol production.

Keywords: COVID-19, 2019 new coronavirus, SARS-cov-2, aerosol, dental assistance, preventive dentistry.

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The Importance of Minimal Intervention Dentistry after the COVID-19 Pandemic: A Look to the Future

Sayene Garcia Batista ^a & Inger Teixeira de Campos Tuñas ^o

Abstract- The new Coronavirus has caused thousands of deaths around the globe, challenged professionals, and collapsed the health systems of many countries, resulting in various measures to contain the spread of COVID-19 and minimize the number of deaths. In the face of this new scenario, researchers and health authorities have been outlining clinical recommendations for dental practice during and after the pandemic. The objective of this paper is to relate the Minimal Intervention Dentistry (MID) with a dental practice of less exposure to aerosols, and, therefore, safer in the current context, after the pandemic of COVID-19. This study also discusses aspects related to bio safety in dentistry, including aerosol control, and lists some of the MID strategies. Bibliographical research was done in the MEDLINE (US National Library of Medicine - NLM) database accessed through Pub Med. The MID advocates the production of selfcare; it aims to control the health disease process, avoids the repetitive restorative cycle, reduces cost, preserves the healthy dental structure, and minimizes pain, all combined with the control of aerosol production. Thus, this model of practice allows dentistry to have a more positive and safer look to the future, after the COVID-19 pandemic.

Keywords: COVID-19, 2019 new coronavirus, SARS-cov-2, aerosol, dental assistance, preventive dentistry.

I. INTRODUCTION

n outbreak of pneumonia began in December 2019 in the city of Wuhan, Hubei province - China, and spread rapidly to several countries.^{1,2} A new strain of Coronavirus has been identified as the causative agent of the disease, called COVID-19 by the World Health Organization (WHO).² COVID-19 is caused by a Betacoronavirus called SARS-CoV-2, which affects the lower respiratory tract and manifests as pneumonia in humans. Despite rigorous global efforts to elaborate preventive measures, the infection caused by COVID-19 continued to increase in many countries around the world.¹⁻⁷ Due to the high risk to countries with vulnerable health systems, the WHO considered the outbreak a Public Health Emergency of International Concern (PHEIC) on January 30, 2020. With the progress of the disease, on March 11, 2020, WHO decreed a pandemic of this disease.1-30

Author α σ: Department of Social and Preventive Dentistry, School of Dentistry, Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil. e-mails: sayenegarciabatista@gmail.com, ingertunas@gmail.com Dentistry professionals have a high risk of infection with SARS-CoV-2 due to exposure to saliva, blood, and aerosol/droplets during most dental procedures.^{1,2,24,30} The transmission of the virus during dental procedures can occur by inhalation of aerosol/droplets of infected individuals or direct contact with mucous membranes, oral fluids, and contaminated instruments and surfaces.^{7,27,31}

The new Coronavirus challenged professionals and collapsed the health systems of many countries, which resulted in various measures to contain the spread of COVID-19 and minimize the number of deaths. In this regard, strict prevention and control measures adopted by governments establish the limitation of people who circulate on the streets, social distancing, the cessation of non-essential commercial activities, new remote work routines, the request to wear masks and the frequent hygiene of the hands.²⁴⁻⁴⁴

Dental professionals have an essential role in preventing the transmission of COVID-19.^{1,7,45} Although many countries suspended routine dental care during the pandemic period, there is a need to handle events related to dental emergencies. Also, in places where the disease is controlled, flexibilization protocols establish the return of activities, including dental services, with the execution of elective procedures as well.

Thus, there is a need to establish service protocols that are safe for both professionals and patients, and convenient in technical and cost terms as well.³³⁻⁴³ Given the evidence of a high risk of infection of dentists and patients due to the aerosol production caused by most invasive procedures, the adoption of the Philosophy of Minimal Intervention in Dentistry has proved to be even more suitable. In this respect, health promotion conducts can benefit professionals and patients.^{7,27} By definition, the Minimum Intervention Dentistry (MID) has the potential to cover all areas of the profession, and it aims to preserve dental tissue as well as to prevent the evolution of the illness.⁴⁶⁻⁴⁸ Therefore, the principles of the minimal intervention are determined by educational and preventive paradigms to minimize restorative needs and make dental treatments more long-standing.49,50

Although there is still a relative resistance and a need for convincing in the implementation of this therapeutic form,^{47,48} the MID needs to be incorporated

by dental specialties to prevent diseases from occurring, and minimize dental strain, hence increasing the longevity of dental elements of individuals who, in the present days, live longer. Furthermore, the MID, in the face of the current health scenario, endorses the decrease in exposure of droplets and aerosols in the dental office, for both the dental team and patients.³⁶⁻⁵² The objective of this paper is to relate the Minimal Intervention Dentistry, a philosophy known for conducts and procedures that preserve the dental structure, with a dental practice of less exposure to aerosols, and, therefore, safer in the current context, post-pandemic of COVID-19. This study also discusses aspects related to bio safety in dentistry, including aerosol control, and lists some of the MID strategies.

II. MATERIALS AND METHODS

Bibliographical research was done in the MEDLINE (US National Library of Medicine - NLM) database accessed through PubMed, with the keywords "Aerosol," "COVID-19," "Dental Care," "Preventive Dentistry," between the years of 2012 and 2020. Inclusion criteria were articles in English, in their full and free versions.

III. Results and Discussion

a) Understanding the transmission of SARS-CoV-2

In search of new evidence, researchers and health authorities have been outlining clinical recommendations for dental practice during and after the pandemic. Thus, understanding the behavior of the COVID-19 agent, as well as how to prevent its transmission, is extremely necessary.²⁶ SARS-CoV-2 infections usually spread through respiratory droplets or contact.²⁴ Therefore, the coughing or sneezing of an infected person can spread SARS-CoV-2 in the air, with the potential to infect individuals in close contact.^{7,25,30,35} Such fact determined the recommendation of social distancing, frequent hand washing and use of masks by the population to minimize the spread of the disease by the community.³⁵⁻⁴³

Another significant route is through the droplets of SARS-CoV-2 on inanimate objects located around an infected individual that is subsequently touched by other individuals.^{53,54} The virus can survive on surfaces for a few hours; thus, to maintain a safer environment in the dental office, it is necessary to disinfect the surfaces after each dental procedure.⁵⁴ The recommended disinfectants are sodium hypochlorite at 0.1%, hydrogen peroxide at 0.5% and alcohol at 70%.^{31,34,45,55-64}

Given the direct transmission through contact, the mucosa of the oral cavity is recognized as a potentially high-risk route of SARS-CoV-2 infection¹, in addition to contaminated hands, which could facilitate the transmission of the virus to patients. Undoubtedly, SARS-CoV-2 is present in the saliva of affected patients.

The biological risk of transmission of SARS-CoV-2 by inhalation when performing dental procedures is high due to the use of hand pieces under irrigation and ultrasound, which leads to the diffusion of aerosol particles of saliva, blood, and secretions. This aerosol production promotes contamination of the environment, instruments, dental appliances, dental team professionals, patients, and surfaces.^{2,7,24,31,53} Although symptomatic patients with COVID-19 have been the major source of transmission; recent observations suggest that asymptomatic patients and patients in incubation are carriers of the SARS-CoV-2.45,65-67 Such epidemiological factor of COVID-19 made its control challenging since it is difficult to identify these patients and place them in restricted guarantine, which contributes to the dissemination of SARS-CoV-2 in the communities. Thus, adequate protection, disinfection of objects and hand washing are indispensable to prevent the spread of this disease. 2,7,35,45

Therefore, every patient should be considered a potential asymptomatic carrier of COVID-19^{7,45,68}. To this date, no effective treatment is available for COVID-19. Moreover, even with a future vaccine, complete eradication of the virus can take time, which reinforces the need for caution in the dental environment.^{40,43} COVID-19, just as HIV infection in the 1980s, will lead to a paradigm shift in biosafety care in dentistry. Standard precautionary measures should be reviewed and improved to adapt the clinical routine to the new Coronavirus.³⁴⁻⁴⁴

b) Current personal protective equipment (PPE) for dental practice

In the dental practice environment, the intense production of aerosols during the procedures exposes workers and patients to the risk of inhaling small particles and droplets, potential carriers of microorganisms such as bacteria and viruses. So, it is crucial to establish a protocol to reduce the risk of contagion, providing a safer environment and protecting patients and oral health professionals.^{36-40,68-70}

Aerosols are liquid and solid particles smaller than 50 μ m in diameter suspended in the air for long periods. The COVID-19 virus is around 0.12 μ m.⁶⁹ Hence, for procedures involving the production of aerosol in dental care, it is necessary a more refined filtration as promoted by the masks N95 and PFF2, also called respirators. N95 and PFF2 masks reduce user exposure to particles up to 0.3 μ m with a minimum filtration rate of 95%. Surgical masks, regularly used in dentistry, offer filtration of larger particles, spatter, and oral/body fluids when used correctly and are frequently changed.^{43,51,52} For the complete and adequate personal protection of the professional and the team, the PPE

that must be used routinely are disposable apron with the weight between 30 and 50 g/m2, disposable cap, professional mask (N95 and PFF2), safety goggles, face shield and gloves (figure 1).³⁷⁻⁴⁴ The face shields or visors provide an ample protection of the face when associated with the use of the professional mask and the goggles with side seal, even if the professional already wears glasses.⁷ The disinfection of the face shields and safety goggles after each attendance is advisable so that there is no contamination. Also, the PPE should be removed carefully.³⁷⁻⁴⁰



Figure 1: Personal protective equipment (PPE) required for dental care

c) Protocol for dental care

Dental professionals should implement strict infection prevention and control measures to avoid the transmission of microorganisms during attendance.³⁶⁻⁴⁴ After the COVID-19 pandemic, for the assistance of asymptomatic patients and suspected or confirmed cases of infection by SARS-CoV-2, dentists should follow new guidelines regarding prevention and control measures, according to the available evidence. Thus, it is recommended a protocol with guidelines to be followed for dental care, determining more rigorous prevention and control actions for patients and dental staff (Table 1).^{7,30,32-44}

d) Health Promotion and Minimal Invasion Dentistry

For the management of dental procedures, it is necessary, in addition to being aware of the transmission routes of SARS-CoV-2, to acknowledge and implement the Minimal Intervention Dentistry. Dentists should adopt strict measures of personal protection and avoid/minimize operations that may produce droplets or aerosols.^{27,35} The risk of direct inhalation of the virus is mainly related to the use of handpieces and ultrasonic cleaners, which generate aerosol and droplets, often mixed with saliva and blood.⁴⁵ Thus, it is advisable to avoid and lessen the use handpieces to reduce the production of of aerosols/droplets and use manual instruments, use rubber dams to significantly reduce the spreading of aerosols/droplets and use surgical aspirators to control the diffusion of particles in the air. $^{\rm 30,32,36,40}$

In this context, the MID, which endorses preservation of the dental structure, extended longevity of teeth, avoids the restorative surgical cycle and reduces treatment costs, should be pointed out as the principal philosophy of dental practice after the COVID-19 pandemic, since it allows performing procedures that, for the most part, minimize or prevent the production of aerosols (figure 2).^{27,40} Among the actions related to MID, they go from adequate diagnosis to inclusion of educational measures related to the production of self-care, chemical-mechanical removal of decayed tissue, ART, sealants and esthetic procedures of minimal intervention (table 2).^{47,48}



Figure 2: Essential guidelines for dental care after the COVID-19 pandemic

It is noteworthy that in many countries, efforts to contain COVID-19 have resulted in an economic recession. The sudden decline in demand for goods and services and unprecedented unemployment have exacerbated the complexity of the current situation. Hence, inevitably, the new reality will imply changes for restructuring and recovery of the economy.⁶ The reflections of COVID-19 on the world economy will represent an impoverishment of populations, justifying the need to adopt MID procedures, since they have lower costs. That will represent more democratic access dentistry, which is essential to especially in underdeveloped and developing countries.6,24,27,69,70

IV. Conclusion

The risk of SARS-CoV-2 infection is high to dentistry professionals and their patients. Therefore, it is necessary to adopt rigorous and functional biosafety protocols, along with the strategies of Minimal Intervention Dentistry. The MID advocates the production of self-care, aims to control the health disease process, avoids the repetitive restorative cycle, decreases cost, preserves the healthy dental structure, minimizes pain, and aerosol production. Such a model of practice allows dentistry to have a more positive and safer look to the future after the COVID-19 pandemic.

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Patient-related consideratios	PPE for the dental team	Administration of the dental environment	Recommendations for dental procedures	Postoperative cleaning and disinfection
 Perform patient triage - Guide patients mainly by telephone before the appointment, make a pre-anamnesis with an evaluation of COVID-19 potential risk. Have you had a fever, cough or shortness of breath? Have you had contact with someone contaminated by COVID-19? On the day of the appointment repeat the anamnesis oriented for COVID- 19 Advise patients on social distancing, mask use and frequent hand hygiene Advise the avoidance of a companion whenever possible, except in cases of need for assistance PPE for patients during care: safety goggles, disposable apron, disposable shoe covers 	 Disposable cap 30G/m² Safety goggles with side protection Face shield N95 or PFF2 mask Long-sleeved, waterproof hood or apron with a minimum weight of 30G/m2 Examination or sterile gloves Recommended Sequence For Ppe Placement: Sanitize hands Put on the disposable apron Put on the surgical mask; N95 respirator or similar Put on the disposable cap Sanitize hands Put on the disposable cap Sanitize hands Put on the face shield Sanitize hands Put on the gloves Recommended Sequence For Ppe Removal: Remove the gloves Sanitize hands Put on the safety goggles Sanitize hands Remove the gloves Recommended Sequence For Ppe Removal: Remove the gloves Sanitize hands Remove the safety goggles Sanitize hands Remove the face shield Sanitize hands Remove the safety goggles Sanitize hands Remove the safety goggles Sanitize hands Remove the mask Sanitize hands Remove the mask 	 Make appointments at longer time intervals in order to avoid crowding in the waiting room and perform the necessary cleaning and disinfection procedures for each service Use disposable shoe covers (patients and professionals) in order to keep the environment cleaner Perform cleaning and subsequent disinfection of reception counters, toilets, door handles, taps, etc., with soap and water and disinfectants such as 70% Ethyl Alcohol or 0.5% Hypochlorite after each service Use covering barriers in equipment such as prosthesis motors and photopolymerization devices in order to prevent cross-contamination The triple syringe should be subjected to cleaning and disinfection to each patient and the exchange of barriers should be performed During circulation in adjacent areas after the attendance, the professional and the team should wear surgical masks and maintain distancing. Patients should reattach their masks after the attendance Ensure air quality and renewal to establish safer environments. It is recommended to use air conditioning with an exhaust that ensures directing of air vents and appropriate air exchanges (minimum of 6 air changes per hour). Another option is to use a portable air filtration unit HEPA (High Efficiency Particulate Arrestance) 	 Performpreoperative mouthwash with 1% to 1.5% Hydrogen Peroxide (9 ml for 30 seconds) or with substances based on 0.05% ethylpyridin chloride or 0.2% povidone-iodine for patients who are not allergic to iodine, or chlorhexidine at 0.12% Always perform fourhand service Avoid aerosolgenerating procedures whenever possible. Avoid the use of handpieces, ultrasound and triple syringe. It is recommended that high-rotation handpieces have an anti-reflux system In case of necessary aerosol-generating procedures, it is indispensable to carry it out with four hands, using powerful suckers (suction pumps) and rubber dams to minimize droplets and aerosols Prioritize minimally invasive or atraumatic restorative techniques - manual instruments only Give preference to extraoral techniques of imaging examinations, panoramic radiography and computed tomography 	 Properly dispose barriers used in infectious waste It is necessary to wait at least 15 minutes for the droplets to decay from the air after the end of a dental procedure and the patient's exit to start cleaning and disinfecting the dental office Perform concurrent cleaning and disinfection between the attendances and at the end of the day, perform the final cleaning 70% ethyl alcohol and sodium hypochlorite should be used after surface cleaning with neutral or alkaline detergents. The recommended exposure for disinfection with 70% ethyl alcohol is three applications with vigorous friction, followed by natural drying between applications

Table 1: Protocol with guidelines for dental care after the COVID-19 pandemic

Minimum Intervention Procedures	Indications	Advantages
Health education	Educational and preventive actions aiming at the instruction of habits that maintain health and prevent diseases, such as motivation and conscious cooperation of patients in health promotion, educational lectures, supervised toothbrushes, evaluation of change in habits and adoption of appropriate eating habits	Appropriation of knowledge about the health-disease process, including risk factors and protection of oral health so that the conscious patient can gain the autonomy of care to promote health
Preventive approach to early carious injuries	Monitoring of non-cavitated lesions, stoppage of mineral losses and disease control at predetermined intervals	Maximum preservation of healthy dental structure; cost reduction to the patient; increased longevity of the functional teeth; repetitive restorative cycle deceleration
Sealants	Deep and retentive fissures in molar and premolar occlusal surfaces, obstructing areas of biofilm retention when the patient cannot adequately sanitize them; in cavitated carious in enamel, where hygiene is compromised	Simplified technique; reduction of operative time; reducing the risk of developing posterior carious lesions
Chemical-mechanical removal of decayed tissue	Aid to atraumatic restorative techniques in dentin lesions with cavitation and without pulp involvement	Preservation of healthy dental tissue, enabling ultraconservative and painless removal of infected tissue; easy application and effectiveness
Atraumatic restorative treatment - ART	Treatment of carious lesions in early lesions, used in places without dental structure or equipment and also in offices or clinics with complete structure	Low cost, simple technique; easy execution; preservation of healthy dental tissue; does not require rotating instruments; does not require anesthesia
Maintenance and repair of adhesive restorations and non-replacement	No intervention in case of minor defects that do not generate negative consequences if untreated and repairs when there are defects that can be corrected by smoothing and polishing	Preservation of dental tissue; reducing the risk of damaging the pulp; no need for anesthesia; reduction of the risk of iatrogenic damage to adjacent teeth; reducing costs to the patient; increased longevity of restoration; repetitive restorative cycle deceleration
Esthetic procedures of minimal intervention	Execution of dental bleaching; ultraconservative preparations for facets (absence of preparations for the direct ones); esthetic transformations without preparation; enamel microabrasion	Maximum preservation of healthy dental structure; reducing costs to the patient; increased longevity of functional teeth; repetitive restorative cycle deceleration

Table 2: MID procedures,	indications and advantages

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Management of Internal Root Resorption A-Case Series

By Dr. Gourav Thapak, Dr. Goldy Rathee, Dr. Jaskiran Cheema & Dr. Parul Chauhan *Abstract*- There is always a dilemma of whether to treat a tooth with a questionable prognosis endodontic ally or extract it and subsequently place an implant. Management of a case of internal root resorption is a challenge to the endodontists. Internal resorption of teeth is an insidious process and is generally found in teeth with previous history of trauma. It may occur in cases with chronicpulpal inflammation, following caries or due to trauma in the form of an accidental blow. This case series report a different method for the management of internal root resorption which showed a favorable prognosis due to appropriate choice of endodontic treatment followed by prosthesis.

Keywords: endodontic treatment, internal root resorption, calcium hydroxide thermoplastized gutapercha technique, MTA.

GJMR-J Classification: NLMC Code: WU 166

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Management of Internal Root Resorption A-Case Series

Dr. Gourav Thapak $^{\alpha}$, Dr. Goldy Rathee $^{\sigma}$, Dr. Jaskiran Cheema $^{\rho}$ & Dr. Parul Chauhan $^{\omega}$

Abstract- There is always a dilemma of whether to treat a tooth with a questionable prognosis endodontic ally or extract it and subsequently place an implant. Management of a case of internal root resorption is a challenge to the endodontists. Internal resorption of teeth is an insidious process and is generally found in teeth with previous history of trauma. It may occur in cases with chronicpulpal inflammation, following caries or due to trauma in the form of an accidental blow. This case series report a different method for the management of internal root resorption which showed a favorable prognosis due to appropriate choice of endodontic treatment followed by prosthesis.

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I. INTRODUCTION

Resorption is defined as a condition associated with either a physiologic or a pathologic process resulting in loss of dentin, cementum or bone.¹ Andreasen has classified tooth resorption as Internal (Inflammatory, Replacement) and External (Surface, Inflammatory and Replacement).²

Internal resorption is an inflammation process initiated within the pulp space with the progressive destruction of intraradicular dentin and dentinal tubules along the middle and apical thirds of the canal walls as a result of clastic activities.² The various etiological factors for internal root resorption are traumatic injury (i.e. thermal chemical mechanical) infection and orthodontic treatment.³ It caused by transformation of normal pulp tissue into granulomatous tissue with giant cells, which resorbs the dentinal walls, advancing from the center to the periphery.⁴

Resorption occurs in two stages: Degradation of the inorganic mineral structure followed by organic disintegration of the matrix.⁵ Internal inflammatory resorption involves progressive loss of dentin, whereas root canal replacement resorption involves subsequent deposition of hard tissue that resembles bone or cementum but not dentin.⁶Radiographically, the IIR displays a clear, oval-shaped radiolucent area around the root canal. In the IRR cases, an irregular enlargement of the root canal with the radiological appearances of a fuzzy material resembling the bone tissue might be observed.⁷Internal inflammatory resorption can be perforating or nonperforating root resorption.

Clinically, the condition is usually asymptomatic, however, it may include the presence of a reddish area – pink spot, which represents the granulation tissue showing through the resorbed area. Radiographs are mandatory for diagnosing internal resorption, which reveals a round-to-oval radiolucent enlargement of the pulp space. The margins are smooth and clearly defined with distortion of the original root canal outline.^{2,3}

Various materials available for the treatment of internal root resorption include MTA, glass ionomer cement, Super EBA, hydrophilic plastic polymer (2-hydroxyethyl methacrylate with barium salts), zinc oxide eugenol and zinc acetate cement, amalgam alloy, composite resin and thermo plasticized gutta-percha administered either by injection or condensation techniques.⁸

This case series reports a different method for the management of internal root resorption which showed a favorable prognosis due to appropriate choice of endodontic treatment followed by prosthesis.

II. CASE SERIES

a) Case I

A 20 year-old male patient sought to a private practice with a chief complaint for discoloration and dull pain in maxillary anterior teeth region since 1 year. Clinical examination reveals non vital response of 11, 21. Radio graphically, maxillary left central incisor showed the radiolucency in the middle third of the root surface indicating of internal resoprtion (figure 1). The patient reports he did not remember trauma history in the same region. It was decided to complete the endodontic therapy for 11, 21.

After rubber dam isolation (Hygiene Dental Dam, Coltene Whaledent Germany) access cavity was initiated without local anesthesia as teeth were non vital. Working length was determined using apex locator (Root ZX II, Morita Tokyo, Japan) (figure 2). Biomechanical preparation was done using hand stainless steel file till 70K wrt 11 and 21 along with the copious irrigation with 5.25% sodium hypochlorite. An intracanal medicament dressing of calcium hydroxide

Author α σ ρ: (B.D.S, M.D.S) Senior Lecturer Department of Conservative Dentistry and Endodontics Sgt Dental College Gurugram. e-mails: gthapak@gmail.com, rathee.goldy1990@gmail.com, kiran.cheema004@gmail.com

Author Ω : (B.D.S, M.D.S) Department of Conservative Dentistry and Endodontics Sudha Rustagi Dental College Faridabad. e-mail: cparul39@gmail.com

was given and access opening was sealed with the cavit cement.

After 7 days patient was recalled for the renewal of calcium hydroxide dressing and again cavity was sealed. During the third visit the canal was irrigated with 17% EDTA and mastercone radiograph was taken (figure 3) and the portion of the canal below the resorptive defect was obturated with gutta percha



Figure 1: Preoperative radiograph



Figure 3: Mastercone radiograph

b) Case li

A 45 year old female patient reported to the department of conservative dentistry and endodontic with the chief complaint of pain in upper left anterior region since 6 month. The patient medical history was noncontributory. Clinical examination showed pinkish discoloration of 22 and vitality test negative for 21 and

(Dentsply, Maillefier Germany) and A H plus sealer (Dentsply, Maillefier Germany) using sectional condensation technique and the remaining canal was obturated with thermoplastized gutta percha technique (figure 4).

After post obtuaration restoration, crown preparation was done and PFM crown placed.



Figure 2: Working length radiograph



Figure 4: Canal obturated with Thermoplastized Technique

22. Radiographic observation showed radiolucency in the root surface of lateral incisors indicating a case of internal resorption (figure 5). It was decided to complete the endodontic therapy for 21, 22 and finally restoration with crown.

During the first visit after isolation was done using rubber dam (Hygiene Dental Dam, Coltene Whaledent, Germany). A cavity was prepared and working length was determined using apex locator (Root ZX II, Morita Tokyo, Japan) (figure 6). Biomechanical preparation was done using hand stainless steel file till 70K wrt 21 and till 50K wrt 22 along with the copious irrigation with 5.25% sodium hypochlorite. An intracanal medicament dressing of calcium hydroxide was given and the tooth was sealed with provisional material.

After 7 days the intracanal dressing was changed for another obtaining by mixing calcium



Figure 5: Preoperative radiograph



Figure 7: Mastercone radiograph

c) Case lii

A 20 year old female patient presented to the department of endodontic with discomfort in her maxillary left central tooth. She reported a trauma on the left central tooth when was child, causing crown fracture. Clinical examination showed the type II fracture of the crown and discolored 21. 21 were found non-vital with no response to electric pulp testing. Radiographic examination revealed a large blunderbuss canal with

hydroxide powder and tooth was sealed. On third visit the intracanal dressing was removed and the canal was irrigated with 17% EDTA and master cone radiograph was taken (figure 7). 21 was obturated with the lateral cold compaction technique and the portion of the canal below the resorptive defect was obturated with gutta percha (Dentsply, Maillefier Germany) and A H plus sealer (Dentsply, Maillefier Germany) using sectional condensation technique and the remaining canal was obturated with thermoplastized gutta percha technique. Then final restoration with composite was done followed with prosthesis (figure 8).



Figure 6: Working length radiograph



Figure 8: Canal obturated with Thermoplastized Technique

associated periapical in relation to 21 (figure 9). Based on history and radiographic finding a provisional diagnosis of internal resorption was made.

In 21 root canal treatment was started with straight line access, working length was determined using radiograph(figure 10) and bleeding point was check using paper point. Biomechanical was done till 80K stainless steel file under copious irrigation with saline. Calcium hydroxide intracanal medicament was place for 2 week and cavity was sealed with temporary material. Following copious irrigation with 5% sodium hypochlorite, calcium hydroxide powder mix was renewed after a week.

Calcium hydroxide was renewed two times in 2 mon due to the exudation into the canal. At the 3 mon visit, white MTA (ProRoot MTA, Dentsply, TN, US) was prepared according to the manufacturer's recommendations and filled incrementally to the canal



Figure 9: Preoperative radiograph

orifice with vertical condensation using the pluggers. Intraoperative radiographies revealed that MTA filled the canal and the resorption defect. A wet cotton pellet was put on the MTA, and the cavity was sealed with the temporary restorative material. After 7 days, the cavity was restored using a composite resin (figure11) filling (Supreme, 3M ESPE, Dental Products, MN, USA) and PFM crown was placed.



Figure 10: Working length radiograph



Figure 11: Canal Obturated With MTA

III. DISCUSSION

undoubtedly resorption Internal is an endodontic challenge, especially, if the resorptive area extensive and perforating. When diagnosed, is immediate removal of the causative agent must be considered, aiming to arrest the cellular activity responsible for the resorptive activity.9 There is always a dilemma of whether to treat a tooth with a guestionable prognosis endodontically or extract it and subsequently place an implant. Bell first reported a case on internal resorption in 1830.¹⁰ Since then there have been numerous reports in the literature. It is a multifactorial process associated with various factors, which may be categorized into physiological resorption, local factors, systemic condition and idiopathic resorption. A combination of hand instrumentation and irrigation was performed in all the teeth. Sodium hypochlorite is the most commonly used irrigant during root canal treatment due to its tissue dissolving and broad antimicrobial properties.⁷

The intracanal dressing used was the calcium hydroxide because of its main anti-inflammatory, antibacterial actions, solvent of organic matter, neutralizing toxins, and stimulation of the repair of calcified tissue.¹¹ Calcium hydroxide has also been shown to have a synergistic effect when used in conjunction with sodium hypochlorite to remove organic debris from the root canal.¹² In this case report I and II, the extensive loss of tooth structure and the clastic non perforating internal root resorption was successfully

managed by warm vertical condensation technique followed by thermo plasticized gutta-percha technique.

Another material that has properties well described in the literature, but has not been used frequently in the repair treatment of internal root resorption, is the mineral trioxide aggregate (MTA). MTA is a commonly used material for perforation repair, because it has many favorable properties such as a good seal ability, biocompatibility, radiopacity and moisture resistance.¹³In case series III MTA was used as an obturating material followed by permanent restoration. MTA was shown to allow proliferation of periodontal cells and cement oblast over itself in animal and cell culture studies.

IV. Conclusion

Early diagnosis, removal of the cause, proper treatment of the resorbed root is mandatory for successful treatment outcome. Internal resorption is an uncommon resorption of the tooth, which starts from the root canal and destroys the surrounding tooth structure. It is easy to control the process of internal root resorption via severing the blood supply to the resorbing tissues with conventional root canal therapy. Regular recall is important to check the status of healing and for the overall prognosis of the tooth.

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Periodontal Health of Patients with Epilepsy

By Diana Patricia Gordon Navarrete, Marina Antonia Dona Vidale, Marco Xavier Vizuete Bolaños Galo Bolívar Pesantez Cuesta, Miguel Ángel Sosa Carrero & Christian Andrés Singo Salazar

Abstract- Epilepsy is a neurological alteration that affects 2% of the people in Ecuador; moreover, it has many oral manifestations and the periodontal zone it is the most affected. The main objective of this study was to identify periodontal's manifestations in epilepsy patients who are been attended at Epilepsy National Center in Ecuador through a cross-sectional study of 44 patients who approved the inclusion criteria. A periodontal examination and epidemiological oral morbidity index (Oral Hygiene of Greene- Vermillion and O'Leary's Biofilm) were performed on each patient. The results were obtained by using the Chi2/Pearson (x2 test p < 0.05) and it showed us that all the patients had a bad tooth brushing; furthermore, 36 patients showed periodontal disease.

Keywords: epilepsy, periodontal manifestations.

GJMR-J Classification: NLMC Code: WU 240

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Periodontal Health of Patients with Epilepsy

Diana Patricia Gordon Navarrete ^α, Marina Antonia Dona Vidale ^σ, Marco Xavier Vizuete Bolaños ^ρ, Galo Bolívar Pesantez Cuesta ^ω, Miguel Ángel Sosa Carrero [¥] & Christian Andrés Singo Salazar [§],

Trabajo realizado en el Centro Nacional de Epilepsia, Ecuador, Quito, ubicada en las calles José Berrutieta y Acevedo.

Fuentes de apoyo: Todos los materiales y equipos odontológicos utilizados para el trabajofueron sustentados por parte de la autora y co-autores.

Todos los autores también fueron parte de la redacción y revisión crítica de este artículo.

Resumen Y Palabras Claves- La epilepsia es una alteración neurológica que afecta al 2% la población ecuatoriana, la cual presenta manifestaciones en la cavidad oral, sobre todo a nivel periodontal. El objetivo del presente estudio fue el de identificar la frecuencia de manifestaciones periodon tales presentes en pacientes con epilepsia, atendidos en el Centro Nacional de Epilepsia "Ecuador", mediante un estudio transversal realizado en 44 pacientes mayores de edad y que cumplieron con los criterios de inclusión. Se realizó a cada paciente un examen periodontal e índices de epidemiológicos de morbilidad bucal (Higiene Oral de Greene-Vermillion y Biofilm de O'Leary).Los resultados obtenidos fueron mediante la prueba de Chi Cuadrado/ Pearson(x² p< 0.05). El total de la población de estudio presentó cepillado dental deficiente, además 36 pacientes presentaron enfermedad periodontal.

palabras-claves: epilepsia, manifestaciones periodontales.

Abstract- Epilepsy is a neurological alteration that affects 2% of the people in Ecuador; moreover, it has many oral manifestations and the periodontal zone it is the most affected. The main objective of this study was to identify periodontal's manifestations in epilepsy patients who are been attended at Epilepsy National Center in Ecuador through a cross-sectional study of 44 patients who approved the inclusion criteria. Α periodontal examination and epidemiological oral morbidity index (Oral Hygiene of Greene-Vermillion and O'Leary's Biofilm) were performed on each patient. The results were obtained by using the Chi²/Pearson (x^2 test p < 0.05) and it showed us that all the patients had a bad tooth brushing; furthermore, 36 patients showed periodontal disease.

Keywords: epilepsy, periodontal manifestations.

Abreviaturas, Siglas y Unidades: ILAE (International League Against Epilepsy), IHO= Índice de Higiene Oral, IPDB= Índice de placa Dentobacteriana, IC= Índice de Calculo, %= porcentaje.

I. INTRODUCCIÓN

a Epilepsia es una enfermedad neurológica crónica ocasionada por una alteración a nivel cerebral, lo que genera predisposición duradera a desarrollar crisis epilépticas, que consigo trae cognoscitivas, consecuencias psicológicas V neurobiológicas. Para que se hable de epilepsia la Organización Mundial de la Salud (OMS) y la Liga Internacional contra la Epilepsia (ILAE) manifiestan que debe haber repetición crónica en las crisis epilépticas, es decir dos o más de manera espontánea para que se diagnostique dicha enfermedad o en una primera crisis en la que se detecta predisposición a su repetición; lo cual puede suceder a cualquier edad.¹⁻³Para que se desarrolle una crisis epiléptica debe desencadenarse una serie de descargas excesivas de un grupo de neuronas y propagarse a las zonas cercanas o distantes dependiendo el caso.⁴

Las manifestaciones clínicas de la epilepsia se dan acorde al área cerebral afectada y al tipo de crisis, en muchos de los casos se evidencia síntomas prodrómicos inespecíficos, los cuales se presentan horas o días previos a la crisis¹.

La ILAE (International League Against Epilepsy) en 2010 presentó la clasificación para las crisis epilépticas divididas de manera sintetizada en: crisis generalizadas, donde la descarga inicial compromete a los dos hemisferios cerebrales; crisis focales, en las cuales seinvolucra un área limitada de circuitos neuronales pudiendo evolucionar a generalizada y finalmente las crisis con comienzo desconocido, en las cuales no se puede determinar su inicio⁵⁻⁷.

Guiados en los estudios existentes en torno a las manifestaciones periodon tales frecuentes en los pacientes con diagnóstico de epilepsia encontramos que se presentan las siguientes:

 Agrandamiento Gingival: es considerada la principal manifestación en pacientes con epilepsia, que se asocia al empleo de Fenitoína en el tratamiento anticonvulsivante⁸.

Author α: Concepción, diseño, análisis y la interpretación de los datos epidemiológicos, clínicos y manifestaciones periodontales.

Author σ: Concepción, diseño, análisis y la interpretación de los datos periodontales (Periodontograma).

Author p: Dirección: Av. Manuel Córdova Galarza, Conjunto "Dos Hemisferios", Manzana N.1/Casa. e-mail: marcovizuete5@gmail.com Author ω : Concepción, diseño y análisis de datos epidemiológicos.

Author ¥: Concepción, diseño, análisis y la interpretación de los datos sobre Índice de placa de O'Leary.

Author §: Concepción, diseño, análisis y la interpretación de los datos sobre Índice de Higiene Oral de Greene y Vermillion.

Ghafoor y cols⁹ entre 2009 y 2013, evidenciaron en los participantes de su publicación la presencia agrandamiento gingival.

- Gingivitis: es otra manifestación mencionada por lo que Pasarin y cols¹⁰, en 2014 la encontraron presente en los pacientes de su estudio, así como también Gonzales y cols¹¹, en 2009.
- *Periodontitis:* hallada en el estudio de Gonzales y cols¹¹ en 2009, documentando la presencia de periodontitis crónica y periodontitis agresiva.

Para el tratamiento de la epilepsia usualmente se receta fármacos anti convulsivantes, que tienen como objetivo el control de las crisis más no la remisión de la enfermedad, por lo que la administración es continua procurando en medida de lo posible quesereduzca los efectos adversos y no incida significativamente en la calidad de vida del paciente; en un mínimo porcentaje de casos especiales el tratamiento es quirúrgico.¹²

La Epilepsia es muy común en el mundo con alrededor de 50 millones de personas que lo padecen, registrándose en Latinoamérica y el Caribe un aproximado de 5 millones, se estima que la mitad no accede servicios de salud. En Ecuador existen más de 200.000 ecuatorianos que padecen epilepsia y el 50% no accede a un tratamiento adecuado lo que empeora su condición médica, odontológica, económica, social y psicológica.⁽¹³⁾

Al ser una enfermedad en crecimiento, el presente artículo es de un estudio transversal en el que se valoró la salud periodontal de pacientes con epilepsia utilizando índices de morbilidad bucal y periodonto grama, para de esta forma el profesional de salud odontológica pueda identificar de mejor manera los signos y síntomas que pueden presentarse en esta enfermedad y así poder tener una visión más clara del proceso salud-enfermedad que genera la Epilepsia a nivel odontológico.

II. MATERIAL Y MÉTODOS

a) Selección de Pacientes

Se seleccionaron 44 pacientes de sexo femenino y masculino, que tienen Epilepsia y reciben tratamiento farmacológico anticonvulsivan te, mayores de 17 años de edad y menores de 65 años de edad. Se seleccionó esta edad debido a que los pacientes debían legalmente ser mayores de edad < <18 años de edad >> y no llegar a la tercera edad < <64 años de edad >>, de acuerdo con la ley vigente del Ecuador. Los pacientes aceptados en el estudio fueron aquellos mayores de 17 años de edad y menores de 65 años de edad que presentaban piezas dentales tanto en el maxilar como en la mandíbula. Los pacientes excluidos del estudio fueron aquellos que presentaban ausencia total de piezas dentales, antecedentes psiquiátricos, limitada apertura bucal, menores de 18 años y mayores de 64 años. Los pacientes fueron atendidos en el Centro Nacional de Epilepsia. Todos los pacientes fueron previamente explicados acerca del estudio y firmaron una carta de consentimiento informado.

b) Diseño del Estudio

Se inició con la recolección de datos socio demográficos <<edad, sexo>>de los pacientes a través de las historias clínicas de cada uno, las cuales fueron autorizadas por cada participante en el estudio y fueron protegidos mediante codificación individual y única. Se empleó un periodonto grama para la realización del examen gingival con el cual se evaluó el estado periodontal en que se encontraba cada paciente. Seguidamente se entregó a cada uno de ellos una pastilla reveladora de placa dentobacteriana para de este modo evaluar la calidad de cepillado dental al realizar el índice de O'Leary y por último, se evaluó la acumulación de placa dentobacteriana y calculo dental por superficie dental, para valorar de este modo la calidad de higiene oral de cada paciente mediante el uso del índice de Greene y Vermillion.

c) Mediciones Clínicas

i. Periodontograma

Empleando un espejo bucal plano #5, una sonda periodontal (PCP116 Satin Steel, Hu-Friedy) y una sonda de Nabers (P2N6 Satin Steel, Hu-Friedy) se dio inicio a realizar el examen periodontal partiendo por la pieza 17 hasta 27 y del 37 al 47 tanto por vestibular como palatino/lingual. Para un correcto diagnóstico se examinó: margen gingival, profundidad de sondaje, nivel de inserción, línea mucogingival, movilidad dental y presencia de furca, para así lograr un adecuado diagnostico periodon tal de acuerdo a la clasificación de ARMITAGE 1999 y siguiendo los parámetros establecidos para realizarlo, Figura 1.¹⁴



d) Índice de placa de O'Leary

A cada paciente se le entrego una pastilla reveladora (Viarden), conla cual se indicó masticar la pastilla y mezclarla con la saliva de su boca, seguido agitarla por todas las áreas de la boca durante unos 30 segundos y al final escupir. Seguidamente con la ayuda de un espejo bucal plano N#5, se recorre y examina todas las superficies dentarias excepto las superficies oclusales e incisales, con el objetivo de registrar el porcentaje de superficies dentarias en donde se ha impregnado el colorante de la pastilla. El examen empezó por la arcada superior desde el molar más distal hasta el molar del lado contrario para luego seguir con el segmento inferior, realizando el mismo procedimiento de acuerdo a los parámetros establecidos para levantar este índice, como se aprecia en la Figura 2.15



Figura 2: Índice de O´Leary, A) pigmentación de la arcada superior e inferior B) pigmentación de la arcada superior

e) Índice de Higiene Oral de Greene y Vermillion

El IHO está compuesto por la valoración de dos componentes: IPDB y el IC a su vez cada uno de estos índices está basado en doce valoraciones clínicas codificadas numéricamente, las cuales representan la cantidad de placa y/o cálculo presente en las superficies bucales y linguales. La valoración se hizo por seis sextantes en total <<3 superiores y 3 inferiores>>.¹⁵

Para el IPDB se situó el explorador de forma paralela a la superficie dentaria, llevando acabo un desplazamiento de una cara proximal a la otra y poniendo atención a la cantidad de placa que es barrida durante el recorrido, tomando en cuenta el nivel hasta donde se ha desarrollado, lo que nos da como indicador de la gravedad de la pieza. En la valoración del IC, se realizó colocando suavemente el explorador dental en el surco gingival distal y dirigiéndolo su bgingivalmente desde el área de contacto distal, al área de contacto mesial. Durante la exploración se tomó en cuenta la condición más desfavorable observada en todas las superficies de los dientes que integran el sextante en cuestión, como se observa en la Figura 3.¹⁵





Figura 3: IHO, A) Levantamiento del índice IHO B) Acumulación de placa bacteriana en piezas dentales superiores.

III. Ética

El estudio fue analizado en sus fundamentos metodológicos, bioéticos y jurídicos, por lo cual fue aprobado por el Subcomité de Ética de Investigación en Seres Humanos de la Universidad Central del Ecuador.

IV. Análisis Estadístico

Los datos obtenidos de las distintas evaluaciones realizadas, se analizaron mediante estadística descriptiva y tomando en cuenta tanto las variables independientes << Periodonto grama, Índice de O'Leary y IHO>> como dependiente<< edad y sexo>>se realizó la prueba χ^2 de Pearson.

v. Resultados

De los 44 pacientes incluidos en el estudio, 23 fueron de sexo femenino y 21 de sexo masculino. Se los

agrupo por edad, 11 pacientes de 18 a 20 años, 16 pacientes de 21 a 30 años, 11 pacientes de 31 a 40 años, 6 pacientes de 41 año o mas.

En el examen peridontal realizado, 8 pacientes no presentaron enfermedad periodontal mientras que 16 pacientes presentarón peridontitis severa, 8 presentaron periodontitis moderada, 3 presentó periodontitis leve y 9 presentaron gingivitis, como se aprecia en la Figura 4. Con respecto a la extensión de la enfermedad periodontal, Figura 4, se obtuvo que 19 pacientes presentaron enfermedad localizada (<30%), 17 presentaron enfermedad periodontal generalizada (>30%).

La enfermedad periodontal presentó una relación significativa p=0,0015 con la edad de los pacientes con Epilepsia.





Figura 4: Resultados de evaluación periodontal, A) Porcentaje de casos de enfermedad periodontal B)Porcentaje de Extensión de la Enfermedad Periodontal

El agrandamiento gingival se presentó en apenas 9 pacientes y de los cuales 5 pacientes era de sexo masculino y 4 de sexo femenino. En cuanto al rango de edad 5 pacientes tenían de 18-20 años, 2 pacientes tenían 21-30 años y 2 pacientes tenían de 31-40 años, Figura 5.





Con respecto a recesiones gingivales 20 pacientes lo presentaron, 10 pacientes eran de sexo masculino y 10 de sexo femenino. En rangos de edad 1

paciente tenía 18-20 años, 3 de 21-30 años, 10 de 31-40 años y 6 de 41 años o más, Figura 6.



Figura 6: Porcentaje de Recesión Gingival/Edad

De acuerdo con la clasificación de movilidad dental de Miller, la movilidad dental se presento en 6 pacientes mientras que el resto no presento movilidad dental. La movilidad dental presentó una relación significativa p=0,018 con la edad de los pacientes que tienen Epilepsia, como se indica en el Cuadro 1.

Cuadro 1: Movilidad Dental				
Tipo de Movilidad según MillerFrecuenciaPorcentaje (%)				
Grado I	6	13.6		
Grado II	1	2.3		
Grado III	1	2.3		

El cuadro muestra el número de pacientes que presentaron grado de movilidad según Miller.

En cuanto con la presencia de Furca según presento en 6 pacientesmientras que el resto no Hamp, la presencia de furca a nivel de molares se presento furca, como se muestra en el Cuadro 2.

Cuadro 2: Presencia de Furca				
Tipo de Movilidad según Miller	Frecuencia	Porcentaje (%)		
Grado I	3	6.8		
Grado II	3	6.8		
Grado III	0	0		

El cuadro muestra el número de pacientes que presentaron furca en piezas molares según Hamp

En el índice de O'Leary los 44 pacientes presentaron una tecnica de cepillado deficiente. De igual manera en el IHO de Greene y Vermillion, 12 pacientes presentaron un condición de higiene oral buena y 32 pacientes como regular, debido a que la mayoria presentó un alto IPDB y bajo inidce de cálculo dental durante la investigación, como se señala en el Cuadro 3.

Cuad	lro	3:	⊩	0
		_		_

Condición	Indice de Placa (%)	Numero de Pacientes	Índice de Cálculo (%)	Numero de Pacientes	Índice de Higiene Oral (%)
Bueno	4.5	2	97.7	43	27.3
Regular	63.6	28	2.3	1	72.7
Deficiente	31.8	14	0	0	0

El cuadro muestra los resultados encontrados en el IHO en porcentajes

VI. Discusión

La importancia de una apropiada salud dental como periodontal es indispensable para una buena salud bucal, con el fin de evitar procesos infecciones localizados que pueden ser desencadenantes de futuras complicaciones sistémicas en pacientes con Epilepsia. Un indicador epidemiológico es un parámetro de comparación que permite evaluar la situación de salud a nivel poblacional y/o individual. En cambio, un índice epidemiológico es una unidad de medida que permite calificar y/o cuantificar un evento epidemiológico. Los índices IHO, O'Leary junto con el examen periodontal nos permitieron conocer la realidad en cuanto a la salud oral de pacientes con Epilepsia atendidos en el Centro Nacional de Epilepsia.

En nuestro estudio se incluyeron 44pacientes diagnosticados con Epilepsia de sexo masculino y femenino, además se dividieron por edad, en grupos comprendidos entre 18 a 20 años, 21 a 30 años, 31 a 40 años y 41 o mas años, donde se consideró a todos como población de estudio debido a que se establecio como objetivo el conocer el estado de salud bucal de todos los pacientes del Centro Nacional de Epilepsia.Los resultados de este estudio fueron valorados mediante observación directa para las manifestaciones gingivales, uso de índices epidemiológicos <<HIO, O'Leary>> y periodonto grama para evaluar la salud bucal de la población de estudio.

Seymour y cols¹⁶, en 1985 y Meráz Acosta¹⁷, en 1998 documentaron presencia de agrandamiento gingival en pacientes epilépticos, así como Ogunbodede y cols¹⁸, que en 1998 evidenció presencia en agrandamiento gingival en un 32.1%. Ghafoor y cols¹⁹, también lo comprobó en su evaluación realizada entre 2009 y 2013 y Pasarin y cols¹⁰, en 2014 registro con respecto a los anteriores la mayor presencia de agrandamiento gingival indicando un 46% de esta. Dicha información obtenida es apoyada con la obtenida en nuestro estudio puesto que se evidencio que el 20,5% de personas con agrandamiento gingival sobre todo en las personas más jóvenes que participaron del estudio es decir menores o igual a 20 años.

La gingivitis acorde con los datos proporcionados en el estudio realizado entre 2009 y 2013 por Ghafoor y cols¹⁹, estuvo presente un 62% con presentaba gingivitis, mientras que Gonzales y cols²⁰, en 2009 encontró que 194 de los 304 tenían diagnóstico de gingivitis y Pasarin y cols¹⁰, en 2014 en su estudio también evidencio presencia de gingivitis en 8 pacientes de 58 participantes. En contraste con los resultados de nuestro estudio que presento 20.5% son datos con cifras inferiores con los planteados anteriormente en otros estudios.

Ogunbodede y cols¹⁸, en 1998 evidenció la presencia de periodontitis crónica en un 69.6% así como Gonzales y cols²⁰, en 2009 registró 59 pacientes de los 304 que evaluaron y Pasarin y cols¹⁰, en 2014 indicó que 50 pacientes de 58 fueron diagnosticados con periodontitis crónica. En el presente estudio la periodontitis severa fue considerablemente alta con 36,4% siendo la patología con mayor presencia en los 44 pacientes evaluados.

Con respecto a la movilidad Pasarin y cols¹⁰, registró su presencia en el estudio que realizaron, sin indicar un porcentaje especifico, mientras que en la realidad de nuestro estudio la presencia de movilidad fue en 8 de 44 pacientes, con mayor medida en Grado N^a1 correspondiente a 13,6%.

En lo referente a higiene bucal inadecuada Pasarin y cols¹⁰, señala que existió un 46.55% con presencia de biofilm en un 86.20% y un 72.41% de cálculo mientras que en nuestro estudio se evidencia higiene oral inadecuada en un 72.7% con biofilm regular en un 63,6% y calculo en 2,3% demostrando un dato mayor en la inadecuada higiene oral respecto al primero, placa con relativa variación entre los dos estudios pero gran diferencia en la presencia de cálculo del estudio antes mencionado y el nuestro.

VII. Conclusiones

El estudio demostró que los pacientes con Epilepsia presentaron un notable deterioro en su salud bucal. La periodontitis severa fue la principal enfermedad periodontal diagnosticada y por lo tanto focos infecciosos localizados con posibilidad de diseminación sistémica. También hubo presencia de movilidad dental junto con presencia de furca a nivel de los molares, por lo que el tratamiento y mantención de la salud periodontal por parte del Periodoncista debe ser exigido para estos pacientes. Aunque no se presenció grandes cantidades de biofilm en piezas dentales durante el Índice de Higiene Oral, la técnica de cepillado de los pacientes fue deficiente por lo que se debe buscar mejorar la técnica de cepillado y evitar futuras acumulaciones de biofilm en piezas dentales con complicaciones dentales y gingivales a corto y largoplazo.

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Submandibular Cervical Mass as the First Presenting Sign of FVPTC. A Case Report and Review of Literature

By Dr. Soumya M, Dr. Radhika M. Bavle, Dr. Sudhakara M. & Dr. Srinath N.

Abstract- Submandibular cervical swellings can manifest with a wide range of differentials which could be congenital, infective, reactive, neoplastic, or metastatic in origin. Here we discuss a case of a 42 year old male patient, who initially presented with a painless mass in the right submandibular region with no other associated symptoms, which on further examination turned out to be metastatic lymphadenopathy. A thorough investigation of the neck was subsequently performed, which lead us to the diagnosis of follicular variant of papillary thyroid carcinoma with submandibular lymphnode metastasis. Thus, the consideration of a metastatic lymph node in the differential diagnosis is always mandatory in the case of a long standing, largely asymptomatic solitary mass in the lateral neck of an adult patient.

Keywords: cervical mass, submandibular swelling, papillary thyroid carcinoma, follicular variant, lymph node metastasis.

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SUBMANDI BULARCERVI CALMASSASTHEF I RSTPRESENTI NGSI GNDFFVPTCACASEREPORTANDREVI EWOFLI TERATURE

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Keywords: cervical mass, submandibular swelling, papillary thyroid carcinoma, follicular variant, lymph node metastasis.

I. INTRODUCTION

Reck masses are frequently encountered in clinical practice. A careful evaluation of these masses along with a lucid history is paramount as they give an insight into the differential diagnosis of the lesion in question. Evaluation of neck masses should generally involve a definite algorithm which includes - a thorough clinical examination, review of the systemic state, physical evaluation of the site in question, imaging, a good differential diagnosis and a sound pathologic assessment.

Eliciting a good history from the patient in terms of the location, growth rate, associated symptoms like referred pain, hoarseness of voice, dysphagia will provide clues in determining the origin and the nature of the pathology.

A detailed knowledge of the anatomy of the triangles of neck and lymphatic drainage of the head

and neck is essential to arrive at a comprehensive differential diagnosis. [1]

Anatomically, the neck can be divided into [1]

- Central Neck
- Lateral Neck further subdivided into
- o Anterior triangle
- o Posterior triangle

Lateral masses in the neck can be categorized broadly into -

- Developmental/congenital anomalies
- Neoplastic lesions benign and malignant
- Traumatic lesions
- Metabolic and Autoimmune disorders
- Infectious or inflammatory lesions
- Vascular and endocrine lesions

The present case in discussion was a lateral neck mass, which on biopsy, revealed metastatic deposits of a lesion carrying features of papillary thyroid carcinoma.

II. CASE PRESENTATION

A 42-year-old male patient reported to our hospital with a complaint of a swelling in the right upper neck region since 2 years. He gave a history of a small painless mass, which grew to the present size of 3x2 cm. Previous medical, family or habit history were non-contributory.

On examination, an extra-oral nodular compressible swelling was evident in the submandibular region about 4 cm below the inferior border of the mandible, anterior to the sternocleidomastoid muscle. It was firm, well-defined and moved on deglutition.

Author α: Department of Oral and Maxillofacial Pathology, Krishnadevaraya College of Dental Sciences & Hospital Bangalore-562157. e-mail: soumyamakarla@gmail.com

Author σ: Professor and Head, Department of Oral and Maxillofacial Pathology, Krishnadevaraya College of Dental Sciences & Hospital, Bangalore. e-mail: radix69@gmail.com

Author p: Reader, Department of Oral and Maxillofacial Pathology, Krishnadevaraya College of Dental Sciences & Hospital, Bangalore. e-mail: sudhakarmop@gmail.com

Author Ω : Professor and Head, Dept of Oral & Maxillofacial Surgery Krishnadevaraya College of Dental Sciences & Hospital, Bangalore e-mail: srinathdr@gmail.com



Figure 1: Clinical image: Extra-oral cervical swelling of about 3x2 cm, evident in the submandibular region about 4 cm below the inferior border of the mandible

Intraorally, there were no contributory findings. Complete blood investigation revealed all values to be within the normal range. Thyroid hormone (TSH) levels were well within limits. A provisional diagnosis of cervical lymphadenopathy suspected to be associated with tuberculosis was made and the lesion was surgically excised. Excisional biopsy revealed a solid soft tissue specimen measuring about 4.8 x3.5 cm; well circumscribed, creamish-brown, rubbery in consistency. Cut surface showed areas of greenish jelly, hemorrhage and cystic degeneration.



Figure 2: Gross specimen: A solid well circumscribed soft tissue specimen, creamish-brown in colour, rubbery in consistency measuring about 4.8 x3.5 cm. Cut surface shows areas of cystic degeneration and haemorrhage

Histopathological sections showed encapsulated lymphoid tissue with peripherally situated lymphoid follicles and centrally numerous large and small thyroid-like follicles, lined by a single layer of secretory epithelial cells with dense basophilic nucleus. The epithelial areas proliferated into papillary growths in The follicles contained homogenous few areas. eosinophilic colloidal secretions with scalloped appearance at the periphery. The epithelial cells showed features of dysplasia, nuclear crowding, overlapping, large open faced nuclei with optical clearing (orphan Annie nuclei), few mitoses and minimal connective tissue stroma in between the cells.

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Figure 3: Figure 3: Photomicrographs of H&E stained tissues exhibit: 3A-Encapsulated lymph node tissue with peripherally situated lymphoid follicles and centrally numerous follicles filled with eosinophilic colloidal material (x40). 3B: Epithelium lining the follicles is thrown into papillary growths (x40). 3C: Follicles are lined by single layer of secretory epithelial cells exhibiting focal nuclear crowding. Edges of the follicle exhibit scalloping of eosinophilic coagulum (x100). 3D: Dysplastic secretory epithelial cells with large open face nuclei, nuclear clearing and minimal stroma (x200).

With these findings, the lesion was diagnosed as a metastatic papillary thyroid carcinoma (PTC) follicular variant. Further evaluation of the head and on computed tomography (CT) scan revealed enlarged right lobe of the thyroid gland with presence of cystic nodules.



Figure 4: CT scan revealed enlarged right lobe of thyroid gland with presence of cystic nodules

Multiple enhancing solid masses were also observed in the carotid space, supra clavicular and lower cervical stations with cystic degenerative changes suggestive of lymphadenopathy. A total thyroidectomy along with right radical neck dissection (RND) was performed under general anesthesia.

The thyroidectomy specimen showed a large nodular lesion with cystic and hemorrhagic areas on gross pathology. Microscopically, features of papillary thyroid carcinoma with sheets of thyroid follicles lined by cells with optically clear nuclei with grooving was observed which confirmed the initial diagnosis. Additionally, 19 lymph nodes were isolated from the RND specimen, of which, 2 showed metastatic deposits.

To further rule out any other metastatic deposits, ultrasonography of the abdomen and pelvis was performed and was found free of any pathology. No metastasis other than that of the cervical lymph nodes was detected.

The patient was referred for auxiliary radiotherapy and was subjected to I¹³¹ therapy for ablation of any residual thyroid tissue. Thyroglobulin levels and an I¹³¹ scan performed after 6 months of the surgery showed normal levels and complete ablation of the residual gland respectively. The patient is on follow up every 6 months and so far is free of any recurrence for the last eight years.

III. Discussion

One of the most important considerations in an adult patient presenting with a mass in the neck should be a neoplasm, either benign or malignant, or a metastatic deposit from a primary cancer.

Skandalakis et al., [2] proposed a "rule of 7" based on duration of the lesions, which stated that time span of symptoms that were caused due to infections was 7 days; for tumours 7 months and an interval of 7 years for developmental anomalies. Our patient, with a history of a neck mass since 2 years, could be categorised under the tumour bracket.

Based on the anatomic location in the present case, neck masses could arise due to:

- i. Ectopic thyroid tissue
- ii. Congenital/ Developmental anomalies
- iii. Thyroid gland pathology
 - a. Benign thyroid lesions Multi-nodular goitre, Hashimoto's thyroiditis,

- b. Thyroid nodules benign/malignant
- iv. Salivary gland pathology
- v. Lymphomas
- vi. Cervical group of lymph nodes -
- o Ectopic nodes
- o Infectious nodes
- o Inflammatory origin Lymphadenitis
- o Hodgkins lymphoma
- o Metastatic nodes

75% of lateral neck masses in patients over 40 years of age have been found to be caused by malignant tumours. The incidence of neoplastic cervical adenopathy increases with age. [3] This conformed with the age group of our patient who was 42 years.

Garrel et al., stated that a lateral cervical mass must indicate the probability of lymph node metastasis firstly and based on the habits of alcohol and tobacco use, of epidermoid carcinoma of upper gastro-intestinal and respiratory tracts [4]. The second most common is thyroid cancer, [5,6] especially in patients under 40 years with no other risk factor, particularly in cases of a cystic cervical mass, [4] similar to our case presentation.

Though congenital anomalies are rare in adults, they cannot be excluded from the differential diagnosis of a neck mass. Branchial anomalies like cleft cysts, sinuses and fistulae are most frequent in the lateral neck. They are generally insidious, asymptomatic lesions. Cystic hygromas and dermoid cysts can also typically present in this area. [3]

Reactive lesions characteristically exhibit signs of inflammation and tenderness and also arise due to infection or granulomatous inflammation. But in our case, the patient was asymptomatic and was initially suspected of tuberculous lymphadenopathy.

Benign tumours like schwannoma, lipoma, hemangioma, parathyroid and salivary adenomas can present as neck masses. Malignant tumours of the neck include soft tissue sarcomas, lymphomas, salivary gland tumours.

The most frequently encountered solitary mass in the lateral neck in an adult is a metastatic lymph node. The location of the affected lymph nodes in the neck is a good indicator of the origin of the lesion Table *1* [7].

Table 1: Patterns of lymp	n node metastasis in head and neck

Lymph node groups	Sites of origin
Level IA (submental)	Anterior oral cavity, lower lip
Level IB (submandibular)	Oral cavity, anterior nasal cavity, submandibular gland, midfacial face skin
Level II (upper jugular)	Oropharynx, oral cavity, nasopharynx, nasal cavity, larynx, hypopharynx
Level III (mid jugular)	Oropharynx, oral cavity, nasopharynx, larynx, hypopharynx
Level IV (lower jugular)	Oropharynx, larynx, hypopharynx, upper esophagus, thyroid

Level V (posterior triangle)	Nasopharynx, posterior scalp skin, thyroid	
Level VI (anterior compartment)	Thyroid, larynx, hypopharynx, upper esophagus	
Supraclavicular	Non-head and neck, thyroid	
Retropharyngeal	Nasopharynx, posterior pharynx	
Parotid	Lateral/upper facial and scalp skin, parotid gland	

Benign and malignant thyroid neoplasms are the leading cause of anterior compartment neck masses. Patients with malignant thyroid nodules present with 40% clinically positive nodes and 90% histologically positive nodes. [5,6]

Several reports state that thyroid carcinomas initially manifest as neck masses not conforming to the typical pattern of the glandular involvement. [8,9] Lymphadenopathy due to metastasis is the initial symptom evident on clinical examination in about 23-56% of the cases of Papillary thyroid carcinomas (PTC). [10]

Such lymph node metastases commonly occur as solid masses in the anterior or lateral aspect of the neck. [11,12] These lymph nodes, usually are chiefly located in levels IIa and III i.e. superior and median cervical areas of the neck. [9]

Such a finding was evident in our case, wherein the clinically detectable lateral neck mass was a solid lesion, which on further investigation was found to be an enlarged lymph node in the anterior triangle of neck.

Imaging is an important adjuvant used for determining the location and features of the lesion in patients presenting with a neck mass. Ultrasonography is a common modality used to evaluate pathologies of the thyroid gland and also to detect metastatic lymphadenopathies.

Rosario et al., have described the characteristic ultrasonic appearance of metastatic lymph nodes in PTC which include:

- i. A minimum axial diameter of 0.7 mm for Level II neck nodes and 0.6 mm for all the other levels of the neck
- ii. Round shape of the lymph node
- iii. Hyperechogenicity in relation to the adjacent muscles,
- iv. Intranodal cystic necrosis,
- v. Peripheral calcifications, and
- vi. The absence of an echogenic hilum.

When the presence of cystic necrosis and calcifications within the lymph node are observed; then the specificity is almost 100% in those patients with PTC. Such a picture is absent in normal or reactive lymph nodes. [10,13]

CT and MRI (magnetic resonance imaging) are indispensible tools in evaluating neck masses. Definitive features of central necrosis, thickened walls, intracystic elements, calcifications, greater peripheral uptake observed in CT scans with contrast, [14] are suggestive of a metastatic thyroid lesion with 100% sensitivity and 90% specificity as compared to sonography with 80% specificity [11,15] as observed in our case.

MRI is the preferred imaging tool for inaccessible or difficult to visualize primary tumour sites - base of tongue, skull. In thyroid carcinomas, MRIs exhibit a T2 hyperintense signal, which indicates thyroglobulin rich material. [4]

In the present case, the neck mass was surgically excised to reveal a solid nodule, rubbery in consistency, with areas of greenish jelly, hemorrhage and cystic degeneration. On pathologic assessment, the nodule was diagnosed as follicular variant of papillary thyroid carcinoma, re-confirmed post total thyroidectomy.

Papillary carcinoma is the most frequently encountered type of thyroid malignancy comprising of 80-85% of cases. It generally presents as a nodular lesion of the thyroid gland. [11, 16]

Loco-regional lymph node metastasis as an initial manifestation is seen in over 50% cases of papillary thyroid cancer. Studies have shown that it does not alter the long-term prognosis particularly in those below 45 years of age. [16]

The follicular variant of papillary thyroid carcinoma (FVPTC) is the most common variant of papillary thyroid carcinoma (PTC), accounting for about 22.5% -30% of all PTCs. [17]

It affects females more than males with a ratio of 3.6:1 and commonly occurs in 3rd to 5th decade of life with a mean age of 44 years. Our patient was diagnosed at 42 years of age, though he was a male patient. This variant of PTC has an excellent prognosis with 98% 20 year survival rate and < 0.2% mortality rate. [17,18]

This histologic type comprises predominantly of follicles of varying sizes, lined by tumour cells which typically exhibit the nuclear features of PTC. The nuclei are large and oval with powdery to optically clear chromatin, cytoplasmic invaginations into the nucleus, increased number of grooves, crowding and overlapping; termed as ground glass or Orphan Annie nuclei which are the hallmark of PTC. Other features include dark hyper eosinophilic colloid, irregular contour of follicles, scalloping of colloid, multinucleated macrophages in lumen of follicles [17] - all of which were evident in this case along with few papillary structures and mitotic figures.

Other variants of PTC include macrofollicular, oncocytic, clear cell, tall cell, columnar, diffuse sclerosing, insular/solid, cribrifiorm-morula.

Histologically, follicular variant of PTC can be mistaken for follicular adenoma or adenocarcinoma, but the distinctive nuclear features of the tumour cells and hypereosinophillic scalloped colloid are characteristic of papillary thyroid carcinoma. [17,18]

The treatment protocol advocated for patients diagnosed with carcinoma of thyroid, with initial presentation of cervical lymph node metastasis is total thyroidectomy along with modified RND as risk of recurrence is reduced with compartment-oriented dissection, than with simple excision of enlarged lymph nodes. [9, 19] Adjuvant radio-ablation with iodine and lifelong thyroxin therapy is recommended to ensure better outcome and quality of life. [9,20]

The above treatment procedure was strictly adhered to for this patient inclusive of the ablation and thyroxin medication. Regular I¹³¹ scans and serum tests at 6-month intervals have shown no evidence of any recurrent disease till date.

IV. Conclusions

The presence of a unilateral, largely asymptomatic, long standing mass in the lateral neck of an adult patient should be considered as metastatic until proven otherwise. A definitive protocol should be adhered to in such cases, which will provide a step-bystep approach to rule out various differentials to arrive at the right diagnosis. Cervical lymphadenopathy is an initial presentation in over 50% cases of PTC, as in the present case. Therefore, including lymph node metastasis from primary thyroid carcinomas especially papillary thyroid carcinoma (follicular variant) into the repertoire of neck lesions is a must for all head and neck pathologists and clinicians.

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- Ideas
- Findings
- Writings
- Diagrams
- Graphs
- Illustrations
- Lectures

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- Electronic material
- Any other original work

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- 2. Drafting the paper and revising it critically regarding important academic content.
- 3. Final approval of the version of the paper to be published.

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Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

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Preparing your Manuscript

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.



Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11¹", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

- a) A title which should be relevant to the theme of the paper.
- b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
- c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
- d) An introduction, giving fundamental background objectives.
- e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
- f) Results which should be presented concisely by well-designed tables and figures.
- g) Suitable statistical data should also be given.
- h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

- i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
- j) There should be brief acknowledgments.
- k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.



Format Structure

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in a research paper?" Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

TIPS FOR WRITING A GOOD QUALITY MEDICAL RESEARCH PAPER

1. *Choosing the topic:* In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. *Think like evaluators:* If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. *Make every effort:* Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. *Know what you know:* Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. *Multitasking in research is not good:* Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. *Never copy others' work:* Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. *Refresh your mind after intervals:* Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. *Think technically:* Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- o Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.



The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- o Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- o Report the method and not the particulars of each process that engaged the same methodology.
- o Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- o If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- o Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- o Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- o In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- o Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- o Do not present similar data more than once.
- o A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- o Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

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CRITERION FOR GRADING A RESEARCH PAPER (COMPILATION) BY GLOBAL JOURNALS

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	А-В	C-D	E-F
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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